

[0025] According to a further feature of the present invention, a majority of the keys provide exactly four direct functions per key.

[0026] According to a further feature of the present invention, the processor is selectively operable in a single-function mode wherein the processor selects a single function on contact with a given one of the keys independent of the direction of motion.

[0027] There is also provided according to the teachings of the present invention, a method for designating functions on a multifunction keypad defined by a plurality of regions on a touch-sensitive surface, each region being designated as a key, the method comprising: (a) identifying a contact location at which an object comes into contact with the touch-sensitive surface, (b) determining a selected key corresponding to the region within which the contact location is located, (c) identifying a direction of motion of the object across the touch-sensitive surface relative to the contact location, and (d) selecting in a manner conditional upon at least the direction of motion one of a plurality of functions associated with the selected key.

[0028] There is also provided according to the teachings of the present invention, a keypad comprising a twelve-key telephone-type alphanumeric keypad, wherein each key is a multifunction key configured for single-contact selection of one of four functions, and wherein each key corresponding to a digit in the range 2-9 is associated with three letters, and wherein the letter "s" is associate with a key corresponding to "*" and the letter "z" is associated with a key corresponding to "#".

[0029] According to a further feature of the present invention, the letters "s" and "z" are selected by contact with the key corresponding to "*" and "#", respectively, in conjunction with a generally upward movement.

[0030] According to a further feature of the present invention, the plurality of keys further includes a row of keys associated with at least the functions ENTER, SPACE and DELETE.

[0031] There is also provided according to the teachings of the present invention, a multifunction keypad comprising: (a) a touch-sensitive surface having defined thereon a plurality of regions designated as keys; and (b) a processor associated with the touch-sensitive surface and configured to: (i) identify a contact location at which an object comes into contact with the touch-sensitive surface, (ii) determine a selected one of the keys corresponding to the one of the regions within which the contact location is located, (iii) identify a path of motion of the object across the touch-sensitive surface relative to the contact location, and (iv) select, in a manner conditional upon at least one parameter of the path of motion, one of a plurality of functions associated with the selected key.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

[0033] FIG. 1 is a schematic plan view of a first preferred implementation of a multifunction keypad, constructed and operative according to the teachings of the present invention;

[0034] FIGS. 2A and 2B are schematic enlarged views of a first key from the keypad of FIG. 1 illustrating the principles of operation of the present invention with two different locations of initial contact with the key;

[0035] FIGS. 3A and 3B are schematic enlarged views of a second key from the keypad of FIG. 1 illustrating the use of variable ranges of zone angles and forbidden zones to render functions selectively easier or more difficult to select;

[0036] FIG. 4 is a schematic plan view of a second preferred implementation of a multifunction keypad, constructed and operative according to the teachings of the present invention;

[0037] FIG. 5 is a schematic enlarged view of a key from the keypad of FIG. 4 illustrating typical zone angles for a six-function key;

[0038] FIG. 6 is a schematic plan view of a third preferred implementation of a multifunction keypad, constructed and operative according to the teachings of the present invention;

[0039] FIG. 7 is a schematic plan view of the keypad of FIG. 6 in a Shift-Lock state;

[0040] FIGS. 8A, 8B and 8C are schematic enlarged views of selected keys from the keypad of FIG. 6 illustrating various preferred zone configurations;

[0041] FIG. 9 is a schematic plan view of a fourth preferred implementation of a multifunction keypad, constructed and operative according to the teachings of the present invention;

[0042] FIGS. 10A, 10B and 10C are schematic enlarged views of selected keys from the keypad of FIG. 9 illustrating various preferred zone configurations;

[0043] FIGS. 11A, 11B and 11C are schematic enlarged views of alternative key configurations for use in multifunction keypads constructed and operative according to the teachings of the present invention;

[0044] FIG. 12 is a schematic flow diagram illustrating a possible implementation of control logic for the processor of a multifunction keypad constructed and operative according to the teachings of the present invention; and

[0045] FIGS. 13A and 13B are schematic side cross-sectional views illustrating operation of a multifunction keypad constructed and operative according to the teachings of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0046] The present invention is a multifunctional keypad implemented using a touch screen, and a corresponding method for operating a keypad.

[0047] The principles and operation of multifunctional keypads according to the present invention may be better understood with reference to the drawings and the accompanying description.

[0048] Referring now to the drawings, FIGS. 1-13 illustrate various preferred implementations of a multifunction keypad, constructed and operative according to the teachings of the present invention. Generally speaking, the mul-